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OLIVE INDUSTRY
in Lower California, Mexico

by J. Henry Burke

Marketing Specialist

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FOREWORD

Olives are one of the world's most important agricultural crops: in the Mediterranean, where they are well established, they have already had centuries of commercial history.

This study, however, concerns a comparatively new olive industry, one that has yet to prove itself--the industry in Lower California, Mexico. This study, which is a part of the continuing analysis of world-competition situations that the Foreign Agricultural Service is making in the interest of American agricultural industries, is devoted largely to the problems that are inherent in the newness of that industry.

D. M. Rubel

Don M. Rubel, Director
Fruit and Vegetable Division

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Issued September 1955

The Olive Industry in Lower California, Mexico

by
J. Henry Burke[1]

SUMMARY AND CONCLUSIONS

The olive industry in Lower California, Mexico, has grown up in only the last 25 years. It is an impressive experiment in agriculture, in which prominent Mexicans have invested large sums of money in land clearance, planting, and irrigation. So far, however, its commercial importance is not yet assured.

The most important factor limiting the development of the industry is the warm winter climate, especially in January, when olive trees need the restraining influence of cool weather. The largest plantings are just south of the California border, in the vicinity of Tijuana, Tecate, and Ensenada; and this area has about the same high winter temperature as San Diego and Vista, California, where olive yields have proved unsatisfactory. If the olives in Lower California react to the warm winters in the same way as the olives in California do, then the yields will be low, the industry will be of minor importance, and other crops will eventually take its place.

Another unsatisfactory climatic condition that limits production in the area and raises the unit costs of production is the insufficient rainfall. Irrigation is necessary for success. Basin irrigation, which now is the practice, is satisfactory for young trees but inadequate for mature trees.

Cultural practices are generally good in the area. Pests are not yet a serious problem. The costs of operating a grove are reasonable, amounting in 1955 to an estimated $25 to $40, United States currency, per acre. If high production could be obtained, the groves would be extremely profitable at current prices.

Today, in 1955, there are some 470,000 olive trees in Lower California, covering an estimated 9,500 acres. Many of the orchards have been planted on land never before used for crops, such as on hillsides. Planting is still continuing, but at a slower rate than formerly. The trees are young: nearly all are less than 20 years; most are from 10 to 15. The Mission variety of California is the most common.

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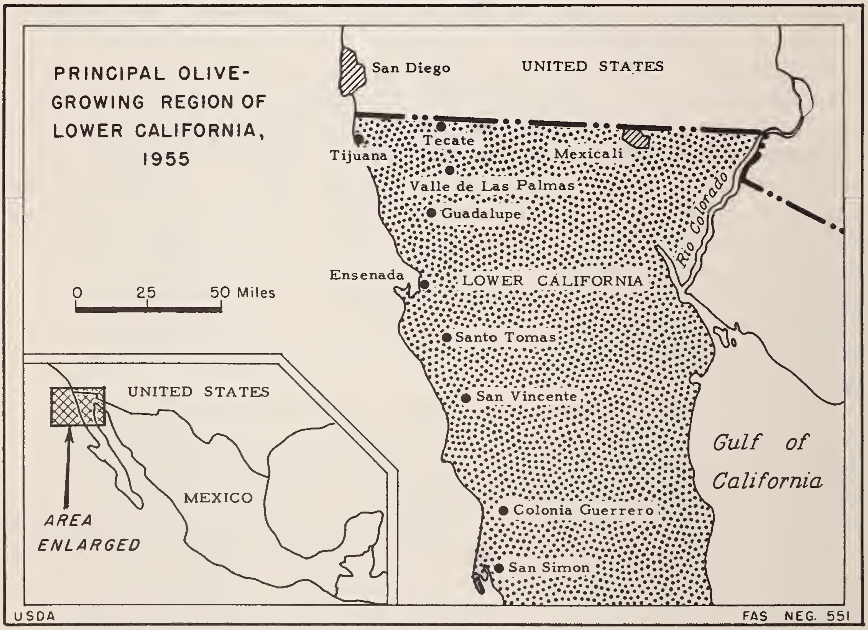
[1] Mr. Burke, Marketing Specialist of the Fruit and Vegetable Division, FAS, has recently returned from a survey of the olive industry in Lower California, Mexico.

A significant number of the plantings, however, must be considered noncommercial: they are hampered by shallow soil and by inadequate irrigation facilities. Even at this early date, when most groves are only beginning to bear, it is apparent that at least a third of the acreage now in olives will prove to be noncommercial.

Production statistics are not available, but the 1954-55 crop is estimated at 1,500 to 2,000 tons. The most important product is brined olives; the estimated 650 tons produced in the 1954-55 season will about equal Mexico's needs. The oil that is produced can supply less than half of the country's needs, and imports will continue for some time.

At present the processing capacity exceeds production. Besides an experimental plant, five plants are in operation; and plans are under way to set up another.



Young mission olive tree in Lower California, Mexico, grafted to the Sevillano, or "Queen," variety.

Large olive plantings near Tijuana, Lower California. Each tree sets in irrigation basin.

Unirrigated plantings of olives are scattered along the road between Tijuana and Tecate.

Rodriguez Dam, near Tijuana, Lower California, Mexico, furnishes water for about 1,600 acres of young olive plantings.

Booster pumps are used in large olive orchards of Lower California to lift water to high plantings.

THE PLANTINGS

The Districts

Mexico's most important olive industry is located within 100 miles of the United States border, and centers around the towns of Tijuana and Ensenada.

The largest grove, about 2,400 acres, is located about 15 miles east of the main highway between Tijuana and Ensenada, about 10 miles north of the latter, in a valley near Guadalupe. Other plantings are reported south of Ensenada along the coastal highway, at Santo Tomas, San Vicente, Colonia Guerrero, and San Simon.

Along the road from Tijuana to Tecate, and beyond Tecate for a distance of 5 miles toward Mexicali, is a large planted area consisting of a few large groves and many small plantings. The most important plantings in this area are located within 25 miles of Tijuana, about 3 miles east of the Rodriguez Dam, which supplies water for the orchards.

A small olive-producing area lies in the Valle de las Palmas, about 10 miles south of Tecate.

A large percentage of all these plantings are on sloping ground. About 25 percent are at elevations under 400 feet; 25 percent, at 400 to 600 feet; and the rest at 600 feet and higher.

The Trees

Number. --No exact data are available on the number of olive trees now growing in Lower California. The Mexican trade estimates it to be as high as 1 million trees, but the author's findings during visits to the chief producing areas do not support so high a figure.

To aid the author in his estimate of trees, the Consulate at Tijuana supplied him with its evaluation of the planted area in 1951, which seems to have been a fairly accurate appraisal. With this evaluation as a basis, the author visited several of the principal producing areas and made careful estimates of the number of trees. For example, the planted area between Tijuana and Tecate was estimated grove by grove, an effort that required more than 50 observations. From this type of data, an estimate of the number of trees in 1955 has been prepared (table 1). Obviously, in a complex area such as this, an exact estimate cannot be made, but it would certainly be fair to assume that the planted area does not exceed half a million trees. Considering that the planting density averages approximately 50 trees to the acre, we may conclude that the acreage in all types of olives in Lower California in 1955 is about 9,500 acres. Not all the plantings were seen, of course. Of the 471,000 trees estimated to be growing on 9,500 acres, about 198,500 did not come under personal observation. These included 100,000 trees estimated to be on small scattered plantings.

Plantings are continuing; and the planted area will continue to grow for some time, though at a slower rate than in the past.

Commercial Value. --The olive plantings of Lower California differ widely in quality, and not all are good enough to be counted as commercial.

Some groves have been planted on unirrigated land and, in the dry climate of the area, must be considered noncommercial. Some are planted where there is enough irrigation to satisfy young trees but not enough for mature trees. Some have been planted in shallow soil, such as that which is found on hillsides; so far, they show no ill effects, but an olive tree must have deep soil if it is to produce commercially.

In addition to plantings with such adverse orchard conditions, there are a considerable number of trees that have been planted in urban areas, mostly in the immediate vicinity of Tijuana and Tecate. These plantings must be considered more as ornamentals than as part of a commercial venture, inasmuch as they will probably lack the consistently good care that is necessary for the production of good-quality olives.

In attempting to evaluate the acreage which is commercial and that which is not, the author has arbitrarily set forth a definition of a commercial tree: it is a tree of such quality that, at the age of 20 years, it will produce at least 25 pounds of olives a year.

Measured by this yardstick, most of the small plantings in and around Tijuana and Tecate are noncommercial; 10 years from now only 20 percent of that acreage is likely to be producing paying crops (table 2). On the large ranches farther out from Tijuana, identified as the Matanuco District, only about one-half of the acreage seems to be commercial: many of the trees are growing on shallow soil, especially those on the steep sloping hillsides; moreover, those on the hillsides will be especially difficult to irrigate. In contrast, the plantings in the deep soil on the Valle de las Palmas have been estimated as 90 percent commercial.

In estimating the plantings not visited, it has been assumed that 50 percent are commercial.

All in all, about 265,000 trees were considered to be commercial. At an average of 50 trees to the acre, this means about 5,500 acres in commercial plantings.

Age. --To estimate the approximate number of trees in each age group, a tabulation was made of all the olive trees between Tijuana and Tecate, more than 100,000 trees in all. A rough classification of these data shows that 25 percent of the plantings were less than 5 years old, another 25 percent were 5 to 10 years old, and about 50 percent were over 10 years.

TABLE 1.--Total number of olive trees in Lower California, 1951 and 1955

District or ranch	1951	1955
La Mesa de Tijuana	4,342	7,500
Matanuco (6 ranches)	88,500	100,000
Valle de las Palmas	17,500	25,000
Valle Redonda[1]	2,000	2,500
Tecate	---	5,000
Rancho Veijo[1]	1,000	2,000
Santa Anita[1]	5,500	7,000
El Sangre[1]	---	5,000
Olivares Mexicanos	115,000	120,000
Ejido (near Guadalupe)[1]	1,000	2,000
Ensenada	6,500	15,000
South of Ensenada:		
Santo Tomas[1]	2,500	3,000
San Vicente[1]	1,600	2,000
Colonia Guerrero and San Simon[1]	50,000	75,000
Other, scattered plantings[1]	---	100,000
Total	295,442	471,000

[1] Plantings not seen by writer.

Source: Except for figures in the first column, total trees in 1951, which are the estimates of the American Consul at Tijuana, all figures were estimated by the writer from observation in the field and from trade data.

TABLE 2.--Total number of olive trees in Lower California and number that are in commercial plantings and percent that are of bearing age, 1955, by district or ranch

District or ranch	Total trees	Trees in commercial plantings		Trees of bearing age
		Number	Percent of total	
				Percent of total
La Mesa de Tijuana	7,500	1,500	20	50
Matanuco (6 ranches)	100,000	50,000	50	30
Valle de las Palmas	25,000	22,500	90	50
Valle Redonda[1]	2,500	1,250	50	---
Tecate	5,000	1,000	20	20
Rancho Veijo[1]	2,000	1,000	50	---
Santa Anita[1]	7,000	3,500	50	---
El Sangre[1]	5,000	2,500	50	---
Olivares Mexicanos	120,000	90,000	75	25
Ejido (near Guadalupe)[1]	2,000	1,500	50	---
Ensenada	15,000	---	---	---
South of Ensenada:				
Santo Tomas[1]	3,000	1,500	50	---
San Vicente[1]	2,000	1,000	50	---
Colonia Guerrero and San Simon[1]	75,000	37,500	50	---
Other, scattered plantings[1]	100,000	50,000	50	---
Total	471,000	264,750	---	---

[1] Plantings not seen by writer.

Source: All figures were estimated by the writer from observation in the field and from trade data.

Very few trees were older than 20 years; apparently the largest number of trees falls in the age group of 10 to 15 years. In general this pattern holds for all the other areas visited, too.

Varieties.--Most of the plantings are of the Mission variety imported from California. There are also some Manzanillo, Nevadillo, and Sevillano, or "Queen," as well as small plantings of other types such as the Barouni and some of the Italian varieties. In an industry so new as this, many types of trees have to be tried, and it will require years to determine which are the most satisfactory.

Source.--The California olive industry has been the most important source of trees for Lower California. In the last 10 years, large numbers of olive cuttings have been obtained in San Diego County and other parts of California; and some trees are still being obtained from the United States.

Trees and cuttings have also been imported from Spain and Italy, and in the spring of 1955 a shipment of 6,000 trees from Seville, Spain, was enroute to Lower California. These trees were reported to be grafted to the Sevillano, or "Queen," variety, which is the best brine olive grown in Seville.

Most growers in Lower California, however, now are raising their own young trees from cuttings. Nearly all of the planted area observed consists of either seedlings or trees grown from cuttings; there are very few top-worked trees. No large nurseries were seen in the area.

Climatic Factors

Climate plays an important part in commercial olive production.

At the University of California, Dr. H. T. Hartmann has carried out extensive experimentation to determine what olive trees need in the way of climate and has determined, for one thing, that low temperatures in January--low enough to "rest" the trees--are necessary for the production of satisfactory crops. His experiments indicate that olive-producing areas with an average January temperature of 45° F. to 50.6° F. have good yields; that areas with 52° F. to 57.6° F. have unsatisfactory yields; and that areas with higher temperatures have no fruits at all.[2]

San Diego, California, for example, has an average January temperature of 55° F., and its olive yields are unsatisfactory. Both Tijuana and Ensenada, in Lower California, have similar averages: United States Weather Bureau records covering a 5-year period indicate 54.7° F. for Tijuana and

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[2] H. T. Hartmann, Olive Production in California, California Agricultural College, Extension Manual 7, 1953, p. 34.

55° F. for Ensenada.[3] Although a large part of the acreage planted to olives in Lower California is some distance removed from these two cities, it still seems to be within the same climatic zone and not favorably situated for good yields. Probably the warm winter weather is the most important limitation on the development of a commercial industry in Lower California.

Cultural Practices

Planting in some groves was observed to be exceptionally dense for olives. Near Tijuana some orchards are planted at least 70 trees to the acre, so close that, when they reach mature size, they will surely shade out the lower branches. No interplanting with annual crops was seen, probably chiefly because of inadequate water supplies.

All of the plantings observed were cultivated with tractors. In some groves, commercial fertilizer is being used.

In the vicinity of Tijuana the largest plantings receive irrigation water from the Rodriguez Dam. Although the dam provides adequate water, the major plantings are located upstream from the dam, requiring that the water be elevated to the groves and then, at the groves, pumped to the high elevations on hillsides. This seems to be an expensive source of water. Some parts of this area are not able to obtain water from the dam and therefore have inadequate water, even for young groves.

In other areas, such as the Guadalupe Valley, water is pumped from wells and boosted to high plantings by electric power. At present considerable expansion of irrigated acreage is taking place in Lower California, and many new wells have recently been completed. The trade reports that in years of light rainfall the existing wells have been unable to furnish adequate water, apparently because of limited underground supplies; and it seems possible that the new wells would further tax the limited supplies. Groves depending on such sources of water may be unable to carry out adequate irrigation programs in dry years.

Irrigation water is now applied in basins around each tree. This device furnishes adequate irrigation for small young trees but not enough for mature trees. According to growers, it is planned to use sprinkler irrigation as the trees reach bearing age.

In the few groves where scale pests are said to be present, oil sprays are reported to be used. However, in the olive plantings visited, no sign of scale infestation was seen. In fact, the groves seemed quite free from pests, a condition not unusual in a new industry. In time, it may be expected,

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[3] According to Jorge A. Vivo and Jose C. Gomez, in Climatologia de Mexico (published by the Instituto Panamericano de Geografia e Historia en Mexico, D. F., 1946), the average January temperatures in these two cities in 1946 were 54.68° F. and 54.86°F., respectively.

Mexico's olive industry will have to combat all the pests now present in the California industry. So far, despite some imports of planting stock from the Mediterranean, apparently no Dacus olive flies have entered Mexico. These flies have done much damage in the Mediterranean olive groves, often destroying as much as a third of a crop: the fly stings the fruits, depositing eggs, which develop into worms; then the worms eat the olives and cause the fruit to drop in only a few days. Should this pest enter Mexico, it would be a most serious one to combat. It would make fruits unsuitable for use as brined olives and would do major damage to the oil crop.

The comments on cultural practices made above apply generally to the large orchards. Many of the small plantings receive little or no care.

PRODUCTION AND MARKETING

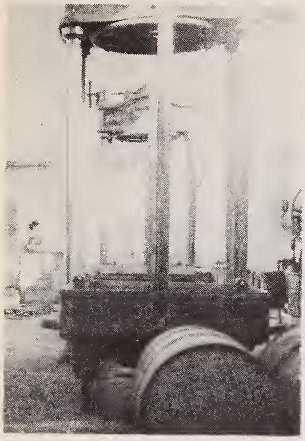
No data are available on olive production in Lower California, but for 4 recent years the trade has made the following estimates (none for 1951-52 and 1952-53):

Season	Production (Metric tons)
1949-50	200
1950-51	700
1953-54	1,500
1954-55	1,500 to 2,000

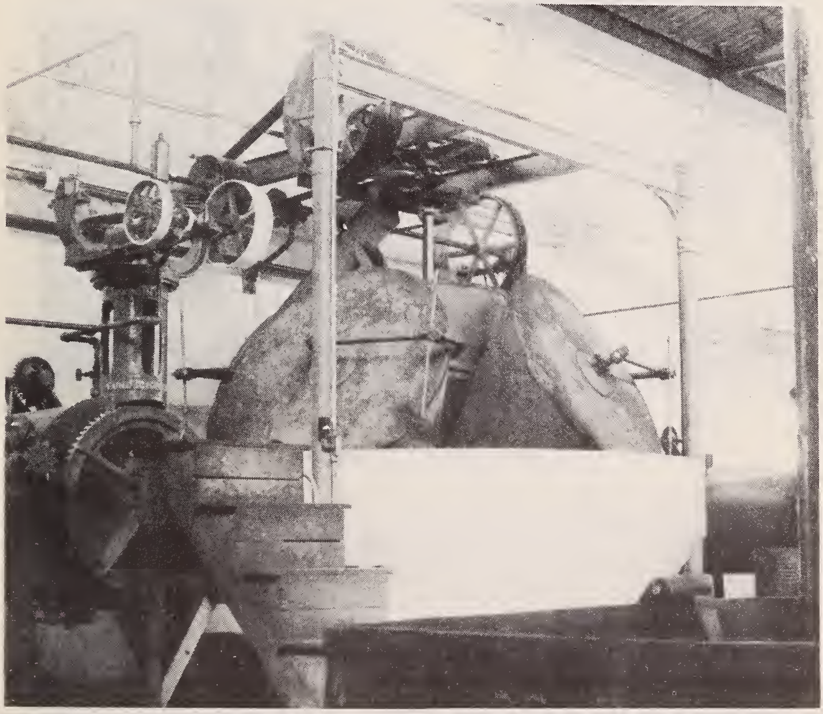
These estimates, which show the rapid growth of production in the last 7 years, seem to be reasonable; the one for 1954-55 probably coincides with fact.

Some trade sources in Mexico estimate that production will reach 7,000 metric tons by 1965; however, the unfavorable climatic and soil factors will probably keep production below this figure. A more likely estimate seems to be 3,500 metric tons; to accomplish even this figure the commercial acreage will have to reach an average production of about 25 pounds per tree by 1965.

The olive-processing industry in Lower California is larger than reports hitherto have indicated, comprising a total of 5 operating plants. There are three small plants for processing brined olives: two are in Ensenada, and the third is near Tijuana. In addition there are two large plants producing both oil and brined olives. The larger one, near Tijuana, is said to have a capacity for pressing 3 tons of olives per hour for oil and handling 30 tons of olives per day for brining; this plant, trade sources indicate, served 110 growers in



OLIVE OIL PLANT IN TIJUANA: Fruit crusher, left; olive oil press, below.



Concrete treating and holding bins in the largest brined-olive plant at Tijuana, Lower California, Mexico.

Olive-sizing machine of United States make is used in the brined-olive plant at Tijuana.

Hundreds of casks of curing olives lie outside an oil- and brined-olive plant on a large plantation near Tijuana.

1954. The other large plant is located about 20 miles from Tijuana, on the road to Tecate.

At present, the processing capacity in Lower California appears to be far in excess of production. The capacity will probably be increased in the near future: reports say that another plant for processing both brined olives and oil will soon be installed at Tecate; and it was observed that the largest ranch near Ensenada, at Guadalupe, had installed an oil-crushing machine, was in the process of installing a centrifuge for olive oil, and was curing casks of brined olives on an experimental basis.

The plants visited had olive-crushing machines purchased in Italy or Spain and sizing machinery for table olives that had been manufactured in the United States. No facilities were seen for processing or canning "ripe" olives.

Except for small quantities of olive oil and brined olives sold retail to tourists at border towns, most of the oil and olives find their current market in Mexico, chiefly in Mexico City.

Brined Olives

Most of the olives grown in Lower California are used to make brined olives. No production data are available, and only rough estimates are possible. In February 1955 one plant claimed to have on hand 400 tons of curing fruit, and another was observed to have on hand an estimated 200 tons. Considering the several small plants in operation, it would seem reasonable to assume that the 1954-55 pack of brined olives was not less than 550 tons or more than 700 tons. In February 1955 in all the various plants there were probably about 2,000 fifty-gallon casks of brine olives curing.

Brined olives are a profitable product. According to the trade, processors buying table-type olives in 1954 paid from 1 peso to 1-1/2 pesos per kilo, or U.S. $72.63 to U.S. $108.94 per ton, for fruit on the tree and were able to sell casks of average-size brined olives for an average wholesale price, f.o.b. Tijuana, of approximately 5.50 pesos per kilo, or U.S. $398.40 per ton.

Imports of brined olives into Mexico are decreasing (table 3), a fact that reflects the growing domestic production. Supplies of brined olives on hand near Tijuana early this year indicate that Mexico may be near self-sufficiency in this commodity. If production were assured--that is, if winters were cold and rainfall were above normal--Mexico would have olives available for export. Such exports would be possible by 1956 and could reach 200 tons (73,487 gallons) by 1960. But, since production may be expected to be erratic, imports of brined olives will probably continue for some years in the near future.

TABLE 3.--Imports of brined olives into Mexico, by country of origin, 1952-54

Country of origin	1952		1953		1954[1]	
	Metric tons	1,000 gallons	Metric tons	1,000 gallons	Metric tons	1,000 gallons
United States........	12.6	4.6	7.8	2.9	5.0	1.8
Spain................	648.6	238.3	533.2	195.9	337.5	124.0
Greece...............	39.8	14.6	45.5	16.7	43.9	16.1
Portugal.............	12.2	4.5	(2)	(3)	2.3	.9
Italy................	6.0	2.2	1.4	.5	---	---
Belgium..............	---	---	17.9	6.6	---	---
Turkey...............	---	---	1.4	.5	---	---
Chile................	15.9	5.9	---	---	---	---
China................	---	---	1.3	.5	---	---
Others...............	.1	(3)	.5	.2	1.4	.5
Total...........	735.2	270.1	609.0	223.8	390.1	143.3

[1] Preliminary.
[2] Less than 50 kilograms.
[3] Less than 500 gallons.

Source: Official Mexican trade data, prepared by the office of the agricultural attaché, American Embassy, Mexico City.

TABLE 4.--Mexican import duties in effect on olives and olive products, May 1,1955

Tariff fraction No.	Commodity	Duty
		In pesos per kilogram plus percent ad valorem[1]
	Olives in oil or brine in wood, tin, or glass containers, with a weight, including the container--	
2-13-20.....	Up to 10 kilos......................	0.35 + 40%
2-13-21.....	Exceeding 10 kilos..................	0.20 + 20%
	Olive oil, with a weight, including the immediate container--	
2-41-35.....	Up to 50 kilos......................	0.50 + 20%
2-41-36.....	Exceeding 50 kilos..................	0.25 + 10%

[1] The ad valorem duty is based on the official price or on the invoice price, whichever is higher. The official price for each tariff class listed above is as follows:

Class	Pesos per gross kilogram
2-13-20:	
In glass containers:	
With seed..	12.00
Without seed or stuffed with vegetable products........	24.00
In other containers:	
With seed..	10.00
Without seed or stuffed with vegetable products........	14.00
2-13-21:	
With seed..	5.20
Without seed or stuffed with vegetable products........	8.00
2-41-35..	7.70
2-41-36..	5.90

When export supplies are available, they will probably be purchased by the California olive industry; for the olive industry in California has always been closely allied with the Mexican industry. Trade sources in Mexico indicate that inquiries about possible supplies have already been received from the United States.

Olive Oil

No data are available on the production of olive oil. Trade sources indicate that in 1954 one plant produced 140 metric tons, a quantity that probably represents about half of total production. It would be conservative to estimate that total olive-oil production did not exceed 300 tons in 1954.

Olive oil is not at present a particularly profitable product in Lower California and is the outlet for fruit that cannot be used for table olives. Trade sources indicate that processors purchasing olives for oil in 1954 could afford to pay only 60 centavos per kilo, or U.S. $43.58 per ton. The wholesale price of pure olive oil that year was 42 pesos, or $3.36, per U.S. gallon; one small producer reported that he sold pure olive oil retail at $5 per U.S. gallon.

Between one-third and one-half of Mexico's oil requirements are said to have been produced in Lower California in 1954. The rest have been supplied by imports, which have averaged 750 metric tons a year for the past 6 years, according to the following data from official sources:

Year	Metric tons
1949	588
1950	752
1951	921
1952	539
1953	969
1954 (Jan. -July)	685

It is reported that Mexican olive oil producers find it difficult to compete with imported olive oils.

Mexico is not likely to become self-sufficient in olive oil for some time. Production of oil probably will increase only as increased production of olives makes larger quantities of low-grade fruit available.

Cost of Production

Thus far no cost-of-production data are available, for the industry is still too young to have had all its cost factors fully evaluated. Ten years from now, when most of the present plantings are of bearing age and the problems of production have been more fully appraised, a significant cost study could be made; but, for the present, cost data are limited to estimates of hypothetical operations and to orchards made up chiefly of young trees.

Abundant labor is available and wages are reported to be low, equivalent to about U.S. $2.50 per day near the border and as low as U.S. $1.50 in the interior. Since all the large olive orchards are cultivated with tractors, cultivation costs are low. In 1941 an estimate was made that the annual cost of cultivating a hectare of olives in Mexico was about 162.36 pesos per hectare, or U.S. $13.14 per acre (at the 1941 rate of exchange--5 pesos to the dollar).[4]

In 1955 a large orchard was being operated at a reported cash cost of 7 pesos per tree per year. With 50 trees to the acre, the cost per acre would be 350 pesos, or U.S. $28. This was the cost for a young orchard still using basin irrigation, little pest control, and little or no fertilizer. Obviously the costs will be higher as the trees mature. All in all, it seems reasonable to estimate that in 1955 most of the commercial irrigated groves of young olive trees in Lower California are being operated at a cash cost of U.S. $25 to U.S. $40 per acre per year. Of course there are many small plantings, such as trees planted in unirrigated fields or along the roadsides, that are grown at little or no cost; but these are nearly all noncommercial and should not be considered as part of the industry.

As has already been pointed out, fruit on the tree in 1954 brought the grower the equivalent of U.S. $43.48 per ton if it was to be used only for oil, and U.S. $108.94 if it was to be used for fine table olives. Considering that the average cash cost of operating a young olive orchard in that year was about U.S. $30 per acre, production would have to average 1,500 pounds per acre at the lower price in order to pay expenses, but only 700 pounds at the higher price.

Obviously groves would be highly profitable at 1954-55 prices if high production could be obtained. But climatic factors will probably limit production; and if average future production is only about 25 pounds to the tree, or 1,250 pounds to the acre, then olives cannot be profitably grown for oil at 1955 prices. Even with low costs of operation, the olive industry of Lower California still must prove itself as a sound commercial venture. Low average production per acre may keep unit costs high and make the industry less competitive than it seems to be to the casual observer.

Tax Relief and Protective Tariffs

The olive industry shares in the tax relief that the Mexican Government, State and Federal, offers to young industries; thus, during the time of waiting for young trees to come into bearing, growers find their financial burdens are eased somewhat.

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[4] Adolpho Vaquez Harrasque, El Cultivo del Olivo en Mexico, p. 33.

Besides, the industry is protected by duties on imports of both olive oil and brined olives (table 4). These duties are quite high and give substantial protection to the new industry.

ACKNOWLEDGMENTS

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Many publications of the College of Agriculture at the University of California were consulted. Of particular usefulness was the work of Dr. T. H. Hartmann, Professor of Pomology at the College.

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